

## CLAIMS

What is claimed is:

1. A method of managing network devices by specifying device components using a parsable string that conforms to a specified grammar, the method comprising the computer steps of:  
creating and storing one or more entity location specifier values each comprising one or more location elements;  
wherein the one or more entity location specifier values are specified as parsable strings;  
wherein the parsable strings conform to the specified grammar;  
wherein each of the one or more location elements is selected from a superset of location elements that specify locations of entities within one or more network devices;  
receiving a retrieval request for a particular entity location specifier value; and  
transmitting the particular entity location specifier value to the application.
2. A method as recited in Claim 1 wherein the parsable strings are stored in MIB objects and wherein the one or more entity location specifier values are specified as the parsable strings in the MIB objects.
3. A method as recited in Claim 1 wherein a particular location element of the one or more location elements is selected from among the group consisting of chassis=value, shelf=value, slot=value, subSlot=value, port=value, subPort=value, channel=value, subChannel=value, and processor=value.
4. A method as recited in Claim 1 wherein the step of transmitting further comprises the step of transmitting the particular entity location specifier value to the application in a single response.
5. A method as recited in Claim 1 wherein the one or more entity location specifier values contain location elements that identify both logical entities and physical entities .

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- 1 6. A method as recited in Claim 1 wherein the one or more entity location specifier values  
2 are stored in MIB-call-records on specifier values in said MIB.
  
- 1 7. A method as recited in Claim 1 wherein the superset of location elements is extensible.
  
- 1 8. A method as recited in Claim 1 wherein the specified grammar is compatible with  
2 Command Line Interface.
  
- 1 9. A method as recited in Claim 1 wherein the specified grammar is defined according to  
2 Augmented Backus-Naur Form (ABNF).
  
- 1 10. A method as recited in Claim 9 wherein the grammar is defined as:  
2 location-specifier = elem \* (',' elem)  
3 elem = loctype '=' number  
4 number = %x00-FFFFFFFF / %d0-4294967295  
5 loctype = 1\*32VCHAR.
  
- 1 11. A method as recited in Claim 10 wherein the "loctype" defined within the grammar is an  
2 enumerated value that provides location information of a particular physical or logical  
3 entity selected from the set consisting of chassis, shelf, slot, port, sub-port, channel, and  
4 sub-channel.
  
- 1 12. A method as recited in Claim 1 wherein the parsable strings conform to a first textual  
2 convention and a second textual convention.
  
- 1 13. A method of managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, the method comprising the computer-implemented steps of:  
4 issuing a retrieval request for a particular entity location specifier value to an agent on a  
5 network device;

6 wherein the particular entity location specifier value is specified as the parsable  
7 string;  
8 wherein the particular entity location specifier value comprises one or more  
9 location elements;  
10 wherein the parsable string conforms to the specified grammar;  
11 wherein each of the one or more location elements is selected from a superset of  
12 location elements that specify locations of all entities within one or more  
13 network devices;  
14 receiving the particular entity location specifier value; and  
15 processing the particular entity location specifier value to determine a location of an  
16 entity.

- 1 14. A method as recited in Claim 13 wherein the parsable string is stored in a MIB object.
- 1 15. A method as recited in Claim 13 wherein a particular location element of the one or more  
2 location elements is selected from among the group consisting of chassis=value,  
3 shelf=value, slot=value, subSlot=value, port=value, subPort=value, channel=value, and  
4 subChannel=value.
- 1 16. A method as recited in Claim 13, wherein the step of receiving further comprises the step  
2 of receiving the particular entity location specifier value in a single response.
- 1 17. A method as recited in Claim 13 wherein the particular entity location specifier value  
2 comprising the one or more location elements that identify both logical entities and  
3 physical entities.
- 1 18. A method as recited in Claim 13 wherein the superset of location elements is extensible.
- 1 19. A method as recited in Claim 13 wherein the specified grammar is compatible with CLI.

1 20. A method as recited in Claim 13 wherein the specified grammar is defined according to  
2 Augmented Backus-Naur Form (ABNF).

1 21. A method as recited in Claim 20 wherein the grammar is defined as:

2 location-specifier = elem \* (',' elem)  
3 elem = loctype '=' number  
4 number = %x00-FFFFFFFF / %d0-4294967295  
5 loctype = 1\*32VCHAR.

1 22. A method as recited in Claim 21 wherein the loctype defined within the grammar is an  
2 enumerated value that provides location information of a particular physical or logical  
3 entity selected from the set consisting of chassis, shelf, slot, port, sub-port, channel, and  
4 sub-channel.

1 23. A method as recited in Claim 13 wherein the parsable string conforms to a first textual  
2 convention and a second textual convention.

1 24. A method as recited in Claim 13 wherein the step of processing further comprises the step  
2 of parsing the parsable string to determine the one or more location elements.

1 25. A computer-readable medium carrying a data structure used in managing network devices  
2 by specifying device components using a parsable string that conforms to a specified  
3 grammar to provide platform independent management, comprising:  
4 a location specifier value comprising one or more location elements;  
5 wherein the location specifier value is specified as the parsable string that  
6 conforms to the specified grammar;  
7 wherein the location specifier value is in a MIB object;  
8 wherein the one or more location elements are selected from a superset of location  
9 elements that specify locations of all entities within one or more network  
10 devices; and

11                    wherein the parsable string can be retrieved from the MIB object with a retrieval  
12                    request.

1    26.    A computer-readable medium carrying one or more sequences of instructions for  
2           managing network devices by specifying device components using a parsable string that  
3           conforms to a specified grammar to provide platform independent management, which  
4           instructions, when executed by one or more processors, cause the one or more processors  
5           to carry out the steps of:  
6           creating and storing one or more entity location specifier values each comprising one or  
7           more location elements;  
8           wherein the one or more entity location specifier values are specified as parsable  
9           strings;  
10          wherein the parsable strings conform to the specified grammar;  
11          wherein each of the one or more location elements is selected from a superset of  
12          location elements that specify locations of all entities within one or more  
13          devices;  
14          receiving a retrieval request for a particular entity location specifier value; and  
15          transmitting the particular entity location specifier value to the application.

1    27.    A computer-readable medium carrying one or more sequences of instructions for  
2           managing network devices by specifying device components using a parsable string that  
3           conforms to a specified grammar to provide platform independent management, when  
4           executed by one or more processors, cause the one or more processors to carry out the  
5           steps of:  
6           issuing a retrieval request for a particular entity location specifier value to an agent on a  
7           network device;  
8           wherein the particular entity location specifier value is specified as the parsable  
9           string;  
10          wherein the particular entity location specifier value comprises one or more  
11          location elements;  
12          wherein the parsable string conforms to the specified grammar;

13 wherein each of the one or more location elements is selected from a superset of  
14 location elements that specify locations of all entities within one or more  
15 network devices;  
16 receiving the particular entity location specifier value; and  
17 processing the particular entity location specifier value to determine a location of an  
18 entity.

1 28. An apparatus for managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, comprising:  
4 means for creating and storing one or more entity location specifier values each  
5 comprising one or more location elements;  
6 wherein the one or more entity location specifier values are specified as parsable  
7 strings;  
8 wherein the parsable strings conform to the specified grammar;  
9 wherein each of the one or more location elements is selected from a superset of  
10 location elements that specify locations of all entities within one or more  
11 network devices;  
12 means for receiving from an application a retrieval request for a particular entity location  
13 specifier value; and  
14 means for transmitting the particular entity location specifier value to the application.

1 29. An apparatus for managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, comprising:  
4 a network interface that is coupled to a data network for receiving one or more packet  
5 flows therefrom;  
6 a processor;  
7 one or more stored sequences of instructions which, when executed by the processor,  
8 cause the processor to carry out the steps of:  
9 creating and storing one or more entity location specifier values each comprising one or  
10 more location elements;

11 wherein the one or more entity location specifier values are specified as parsable  
12 strings;  
13 wherein the parsable strings conform to the specified grammar;  
14 wherein each of the one or more location elements is selected from a superset of  
15 location elements that specify locations of all entities within one or more  
16 network devices;  
17 receiving from an application a retrieval request for a particular entity location specifier  
18 value; and  
19 transmitting the particular entity location specifier value to the application.

1 30. An apparatus for managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, comprising:  
4 means for issuing a retrieval request for a particular entity location specifier value to an  
5 agent on a network device;  
6 wherein the particular entity location specifier value is specified as the parsable  
7 string;  
8 wherein the particular entity location specifier value comprises one or more  
9 location elements;  
10 wherein the parsable string conforms to the specified grammar;  
11 wherein each of the one or more location elements is selected from a superset of  
12 location elements that specify locations of all entities within one or more  
13 network devices;  
14 means for receiving the particular entity location specifier value; and  
15 means for processing the particular entity location specifier value to determine a location  
16 of an entity.

1 31. An apparatus for managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, comprising:  
4 a network interface that is coupled to a data network for receiving one or more packet  
5 flows therefrom;

6 a processor;  
7 one or more stored sequences of instructions which, when executed by the processor,  
8 cause the processor to carry out the steps of:  
9 issuing a retrieval request for a particular entity location specifier value to an agent on a  
10 network device;  
11 wherein the particular entity location specifier value is specified as the parsable  
12 string;  
13 wherein the particular entity location specifier value comprises one or more  
14 location elements;  
15 wherein the parsable string conforms to the specified grammar;  
16 wherein each of the one or more location elements is selected from a superset of  
17 location elements that specify locations of all entities within one or more  
18 network devices;  
19 receiving the particular entity location specifier value; and  
20 processing the particular entity location specifier value to determine a location of an  
21 entity.

- 1 32. A method of managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, the method comprising the computer steps of:  
4 creating and storing one or more entity location specifier values each comprising one or  
5 more location elements;  
6 wherein the one or more location elements are for logical entities and physical  
7 entities;  
8 wherein the one or more entity location specifier values are specified as parsable  
9 strings in MIB objects;  
10 wherein the parsable strings conform to ABNF;  
11 wherein each of the one or more location elements is selected from a superset of  
12 location elements that specify locations of all entities within one or more  
13 network devices;  
14 receiving from an application a single retrieval request for a particular entity location  
15 specifier value; and



16 transmitting the particular entity location specifier value to the application in a single  
17 response.

1 33. A method of managing network devices by specifying device components using a  
2 parsable string that conforms to a specified grammar to provide platform independent  
3 management, the method comprising the computer-implemented steps of:  
4 issuing a single retrieval request for a particular entity location specifier value to an agent  
5 on a network device;  
6 wherein the particular entity location specifier value is specified as the parsable  
7 string;  
8 wherein the particular entity location specifier value comprises one or more  
9 location elements;  
10 wherein the one or more location elements are for logical entities and physical  
11 entities;  
12 wherein the parsable string conforms to ABNF;  
13 wherein each of the one or more location elements is selected from a superset of  
14 location elements that specify locations of all entities within one or more  
15 network devices;  
16 receiving the particular entity location specifier value in a single response; and  
17 processing the particular entity location specifier value to determine a location of an  
18 entity.